

# Claims

- [c1] 1. A read only memory device with a high dielectric constant tunneling dielectric layer, comprising:
- a substrate;
  - a tunneling dielectric layer, disposed over the substrate, wherein the tunneling dielectric layer is formed with a material selected from the group consisting of  $\text{HfSiON}$  and  $\text{HfO}_x\text{N}_y$ ;
  - an electron trapping layer, disposed over the tunneling dielectric layer;
  - a top oxide layer, disposed over the electron trapping layer, wherein the tunneling dielectric layer, the electron trapping layer and the top oxide layer form a stacked structure;
  - a conductive layer, disposed at least over the top oxide layer; and
  - a buried drain region, configured in the substrate beside both sides of the stacked structure.
- [c2] 2. The read only memory device with a high dielectric constant tunneling dielectric layer of claim 1, wherein a dielectric constant of the tunneling dielectric layer is greater than a dielectric constant of silicon dioxide.

- [c3] 3. The read only memory device with a high dielectric constant tunneling dielectric layer of claim 1, wherein a buried drain oxide layer is further disposed over the buried drain region beside both sides of the stacked structures.
- [c4] 4. The read only memory device with a high dielectric constant tunneling dielectric layer of claim 1, wherein the electron trapping layer comprises silicon nitride.
- [c5] 5. The read only memory device with a high dielectric constant tunneling dielectric layer of claim 1, wherein the tunneling dielectric layer is formed with a material selected from the group consisting of  $\text{ZrO}_2$ ,  $\text{HfO}_2$  and  $\text{ZrO}_x\text{N}_y$ .